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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,077	06/01/2005	Diego Brita	FE 6085 (US)	8072

34872 7590 01/26/2007

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INTELLECTUAL PROPERTY
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EXAMINER	
CHOI, LING SIU	
ART UNIT	PAPER NUMBER
1713	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,077	BRITA ET AL.	
	Examiner	Art Unit	
	Ling-Siu Choi	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/15/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-28 are pending, wherein claims 1-14 are drawn to a solid catalyst component; claims 15-24 are drawn to a catalyst for polymerizing olefins; claims 25-28 are drawn to a process of (co)polymerizing olefins. Claims 1, 15, and 25 are independent claims.

Claim Objections

2. Claims 14 and 18 are objected to because of the following informalities: (a) **claim 14**, line 3, "R" is suggested to be changed to --R^1-- and (b) **claim 18**, line 2, "Al trialkyl compound" is suggested to be changed to --aluminum trialkyl compound--.

Appropriate correction is required.

Claim Analysis

3. Summary of Claim 1:

A **solid catalyst component** to polymerize olefins comprising
Mg,
Ti,
a halogen
an electron donor compound(ED): ethers, esters, amines, ketones, or nitriles
wherein the molar ratio of Mg/Ti > 5 and the molar ratio of ED/Ti > 3.5

Summary of Claim 15:

A **catalyst** for the polymerization of olefins comprising a product obtained by contacting	
A	a solid catalyst component comprising Mg, Ti, a halogen, and an electron donor compound (ED) selected from ethers, esters, amines, ketones, or nitriles wherein the molar ratio of Mg/Ti > 5 and the molar ratio of ED/Ti > 3.5
B	at least one aluminum compound and **optionally,**
C	an external electron donor compound

Summary of Claim 25:

A **process of (co)polymerizing olefin** in the presence of a catalyst comprising a product obtained by contacting:	
A	a solid catalyst component comprising Mg, Ti, a halogen, and an electron donor compound (ED) selected from ethers, esters, amines, ketones, or nitriles wherein the molar ratio of Mg/Ti > 5 and the molar ratio of ED/Ti > 3.5
B	at least one aluminum compound and **optionally,**
C	an external electron donor compound

Claim Rejections - 35 USC § 102

4. **The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:**

> **A person shall be entitled to a patent unless --**
> **(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.**

5. Claims 1-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Goeke et al. (EP 0 004 647 A2).

Goeke et al. disclose a **catalyst** comprising (A) a **precursor** in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R")_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound **[$Ti(OR)_aX_b$]**, a magnesium compound **[MgX_2]**, and an electron donor and **Mg/Ti = about 0.5-56** (preferably about 1 to 10); **electron donor/Ti = about 2-85** (preferably about 3 to 10) (page 12-14; claim 1). Goeke et al. further disclose that the electron donor is alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones – tetrahydrofuran and ethyl acetate being exemplified; the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2Cl$, $Al(i\text{-}C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof (page 14, lines 1-11 and 27-31; claim 1). Thus, the present claims are anticipated by the disclosure of Goeke et al.

6. Claims 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Goeke et al. (EP 0 004 647 A2).

Goeke et al. disclose a process to form a copolymer of ethylene and a comonomer in gas phase in the presence of catalyst which comprises (A) a precursor in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R")_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound **[$Ti(OR)_aX_b$]**, a magnesium compound **[MgX_2]**, and an electron donor - **Mg/Ti = about 0.5-56** (preferably about 1 to 10) and **electron donor/Ti = about 2-85** (preferably about

3 to 10); the electron donor is alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones – tetrahydrofuran and ethyl acetate being exemplified; the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2Cl$, $Al(i\text{-}C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof ; the comonomer is $C_{3\text{-}8}$ comonomer in an amount of at least 1 to 10 mol % (page 12-14 - especially page 14, lines 1-11 and 27-31; page 19, lines 31-37; page 20, lines 1-30; claim 1). Thus, the present claims are anticipated by the disclosure of Goeke et al.

7. Claims 1-8 and 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ala-Hulkku et al. (EP 0 416 928 A2).

Ala-Hulkku et al. disclose a **procatalyst** comprising a solid carrier with a **magnesium** compound, an **electron donor compound**, and monocyclopentadienyl **titanium** tri**chloride** on its surface, wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a **cyclic ether**, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; **Mg/Ti = 1 – 10** [Ti/Mg = 0.1 to 1.0]; **electron donor/Ti = 0.05-4.5** [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)]; the magnesium compound is preferably magnesium dichloride ($MgCl_2$) (abstract; page 3, lines 39-47; page 4, lines 18-20; page 5, lines 52; claim 5). Thus, the present claims are anticipated by the disclosure of Ala-Hulkku et al.

8. Claims 15-17 and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Ala-Hulkku et al. (EP 0 416 928 A2).

Ala-Hulkku et al. disclose a **catalyst** comprising (A) a solid carrier with a **magnesium** compound, an **electron donor compound**, and monocyclopentadienyl **titanium** tri**chloride** on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a **cyclic ether**, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; **Mg/Ti = 1 – 10** [Ti/Mg = 0.1 to 1.0]; **electron donor/Ti = 0.05-4.5** [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)] (abstract; page 3, lines 39-51 ; page 4, lines 18-20; page 5, lines 52; claim 5). Ala-Hulkku et al. further disclose that "....procatalyst was suspended in..... pentane and .....alkyl aluminum was added to it.....The mixture was agitated at room temperature in nitrogen flow for about 20 minutes" (page 5, lines 51-54). Thus, the present claims are anticipated by the disclosure of Ala-Hulkku et al.

9. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Ala-Hulkku et al. (EP 0 416 928 A2).

Ala-Hulkku et al. disclose a **process** for olefin (co)polymerization in the presence of a catalyst comprising (A) a solid carrier with a **magnesium** compound, an **electron donor compound**, and monocyclopentadienyl **titanium** tri**chloride** on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a **cyclic ether**, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; **Mg/Ti = 1 – 10** [Ti/Mg = 0.1 to 1.0]; **electron donor/Ti = 0.05-4.5** [electron donor/ Mg =

electron donor/Ti = (0.5-4.5)(0.1-1.0)]; olefin is ethylene or a combination of ethylene and α-olefin (abstract; page 3, lines 39-51; page 4, lines 18-20; page 5, lines 52; page 6, lines 1-19; claim 5). Thus, the present claims are anticipated by the disclosure of Ala-Hulkku et al.

Claim Rejections - 35 USC § 103

10. **The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

11. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

Goeke et al. disclose a catalyst comprising (A) a precursor in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R")_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound $[Ti(OR)_aX_b]$, a magnesium compound $[MgX_2]$, and an electron donor and Mg/Ti = about 0.5-56 (preferably about 1 to 10); electron donor/Ti = about 2-85 (preferably about 3 to 10) (page 12-14; claim 1). Goeke et al. further disclose that the electron donor is **tetrahydrofuran;** the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2Cl$, $Al(i\text{-}C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof (page 14, lines 1-11 and 27-31; claim 1).

The difference between the present claims and the disclosure of Goeke et al. is the requirement of an external electron donor which is an aliphatic ether or tetrahydrofuran to be used in the present invention.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an **external donor which is the same** or different type **with respect to the internal donor** (pages 6-7). Govoni et al. further disclose that "[t]he external donor is used to confer to the catalyst the required high stereospecificity. However, when particular diethers are employed as internal donors, the catalyst stereospecificity is sufficiently high and no external donor is required" (page 7, lines 15-20). In other words, if the internal electron donor is not diether, an external electron donor is required to obtain the high stereospecificity [***motivation***]. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use tetrahydrofuran as the external electron donor in the disclosure of Goeke et al. to obtain the high stereospecificity and thereby obtain the present invention.

12. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Hulkku et al. (EP 0 416 928 A2) in view of Govoni et al. (WO 93/03078).

Ala-Hulkku et al. disclose a catalyst comprising (A) a solid carrier with a magnesium compound, an electron donor compound, and monocyclopentadienyl titanium trichloride on its surface and (B) a cocatalyst which is preferably

trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a cyclic ether, or an aliphatic ketone and **tetrahydrofuran** is exemplified as the electron donor; Mg/Ti = 1 – 10 [Ti/Mg = 0.1 to 1.0]; electron donor/Ti = 0.05-4.5 [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)] (abstract; page 3, lines 39-51 ; page 4, lines 18-20; page 5, lines 52; claim 5).

The difference between the present claims and the disclosure of Ala-Hukku et al. is the requirement of an external electron donor which is an aliphatic ether or tetrahydrofuran to be used in the present invention.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an **external donor which is the same** or different type **with respect to the internal donor** (pages 6-7). Govoni et al. further disclose that "[t]he external donor is used to confer to the catalyst the required high stereospecificity. However, when particular diethers are employed as internal donors, the catalyst stereospecificity is sufficiently high and no external donor is required" (page 7, lines 15-20). In other words, if the internal electron donor is not diether, an external electron donor is required to obtain the high stereospecificity [***motivation***]. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use tetrahydrofuran as the external electron donor in the disclosure of Ala-Hukku et al. to obtain the high stereospecificity and thereby obtain the present invention.

13. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

Goeke et al. disclose a catalyst comprising (A) a precursor in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R")_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound $[Ti(OR)_aX_b]$, a magnesium compound $[MgX_2]$, and an electron donor and Mg/Ti = about 0.5-56 (preferably about 1 to 10); electron donor/Ti = about 2-85 (preferably about 3 to 10) (page 12-14; claim 1). Goeke et al. further disclose that the **electron donor** is alkyl **esters** of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones – tetrahydrofuran and ethyl acetate being exemplified; the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2Cl$, $Al(i\text{-}C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof (page 14, lines 1-11 and 27-31; claim 1).

The difference between the present claim and the disclosure of Goeke et al. is the requirement of the external electron donor to be a specific silicon compound.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that "[w]hen the **internal donor is an ester**.....the external donor is preferably selected from the silicon compounds of the formula $\mathbf{R_1R_2Si(OR)_2}$...." to obtain the high spereospecificity

[***motivation***] (page 7, lines 15-16; page 16, lines 13-16). In light of such benefit, it would have been obvious to use the specific silicon compound in the disclosure of Goeke et al. to obtain the high stereospecificity and thereby obtain the present invention.

14. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Hulkku et al. (EP 0 416 928 A2) in view of Govoni et al. (WO 93/03078).

Ala-Hulkku et al. disclose a catalyst comprising (A) a solid carrier with a magnesium compound, an electron donor compound, and monocyclopentadienyl titanium trichloride on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the **electron donor** is an alkyl **ester** of a carboxylic acid, an aliphatic ester, a cyclic ether, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; Mg/Ti = 1 – 10 [Ti/Mg = 0.1 to 1.0]; electron donor/Ti = 0.05-4.5 [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)] (abstract; page 3, lines 39-51 ; page 4, lines 18-20; page 5, lines 52; claim 5). Ala-Hulkku et al. further disclose that "....procatalyst was suspended in..... pentane and .....alkyl aluminum was added to it.....The mixture was agitated at room temperature in nitrogen flow for about 20 minutes" (page 5, lines 51-54). Thus, the present claims are anticipated by the disclosure of Ala-Hulkku et al.

The difference between the present claim and the disclosure of Ala-Hulkku et al. is the requirement of the external electron donor to be a specific silicon compound.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a

titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that "[w]hen the **internal donor is an ester**.....the external donor is preferably selected from the silicon compounds of the formula $\mathbf{R_1R_2Si(OR)_2}$...." to obtain the high spereospecificity [***motivation***] (page 7, lines 15-16; page 16, lines 13-16). In light of such benefit, it would have been obvious to use the specific silicon compound in the disclosure of Ala-Hulkku et al. to obtain the high stereospecificity and thereby obtain the present invention.

15. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

Goeke et al. disclose a catalyst comprising (A) a precursor in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R")_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound $[Ti(OR)_aX_b]$, a magnesium compound $[MgX_2]$, and an electron donor and Mg/Ti = about 0.5-56 (preferably about 1 to 10); electron donor/Ti = about 2-85 (preferably about 3 to 10) (page 12-14; claim 1). Goeke et al. further disclose that the electron donor is alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones; the activator is aluminum alkyl or aluminum alkyl (page 14, lines 1-11 and 27-31; claim 1).

The difference between the present claim and the disclosure of Goeke et al. is

the requirement of the catalyst to be pre-polymerized to have the specific amount of the polymer.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that the catalyst is undergone pre-polymerization treatment with ethylene and/or alpha-olefin to obtain a prepolymerized catalyst having polymer **in an amount from about 1 to about 1,000 g polymer per g of the catalyst** (page 25, lines 17-24). The pre-polymerization treatment "allow to control the polymerization process in the gas phase without the drawbacks.... which are essentially due to the low heat transfer capability of the gas phase and to the formation of electrostatic charges, which determine the tendency of the catalyst and the polymer particles to adhere to the reactor walls" [***motivation***] (page 6, lines 7-13). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre-polymerized catalyst in the disclosure of Goeke et al. to avoid fouling and thereby obtain the present invention.

16. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Hulkku et al. (EP 0 416 928 A2) in view of Govoni et al. (WO 93/03078).

Ala-Hulkku et al. disclose a catalyst comprising (A) a solid carrier with a magnesium compound, an electron donor compound, and monocyclopentadienyl

titanium trichloride on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a cyclic ether, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; Mg/Ti = 1 – 10 [Ti/Mg = 0.1 to 1.0]; electron donor/Ti = 0.05-4.5 [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)] (abstract; page 3, lines 39-51 ; page 4, lines 18-20; page 5, lines 52; claim 5).

The difference between the present claim and the disclosure of Ala-Hulkku et al. is the requirement of the catalyst to be pre-polymerized to have the specific amount of the polymer.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that the catalyst is undergone pre-polymerization treatment with ethylene and/or alpha-olefin to obtain a prepolymerized catalyst having polymer in **an amount from about 1 to about 1,000 g polymer per g of the catalyst** (page 25, lines 17-24). The pre-polymerization treatment "allow to control the polymerization process in the gas phase without the drawbacks.... which are essentially due to the low heat transfer capability of the gas phase and to the formation of electrostatic charges, which determine the tendency of the catalyst and the polymer particles to adhere to the reactor walls" [***motivation***] (page 6, lines 7-13). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to use pre-polymerized catalyst in the disclosure of Ala-Hulkku et al. to avoid fouling and thereby obtain the present invention.

17. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Hulkku et al. (EP 0 416 928 A2) in view of Govoni et al. (WO 93/03078).

Ala-Hulkku et al. disclose a process to polymerize ethylene in the presence of a catalyst comprising (A) a solid carrier with a magnesium compound, an electron donor compound, and monocyclopentadienyl titanium trichloride on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a cyclic ether, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; Mg/Ti = 1 – 10 [Ti/Mg = 0.1 to 1.0]; electron donor/Ti = 0.05-4.5 [electron donor/ Mg = electron donor/Ti = (0.5-4.5)(0.1-1.0)]; olefin is ethylene or a combination of ethylene and α-olefin (abstract; page 3, lines 39-51; page 4, lines 18-20; page 5, lines 52; page 6, lines 1-19; claim 5). Ala-Hulkku et al. further disclose that "....procatalyst was suspended in..... pentane and .....alkyl aluminum was added to it.....The mixture was agitated at room temperature in nitrogen flow for about 20 minutes" (page 5, lines 51-54).

The difference between the present claim and the disclosure of Ala-Hulkku et al. is the requirement of the process for olefin polymerization, comprising the catalyst to be pre-polymerized.

Govoni et al. disclose a process to polymerize ethylene in the preence of a catalyst which comprises (A) a solid component comprising a titanium compound

containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that the catalyst is undergone pre-polymerization treatment with ethylene and/or alpha-olefin to obtain a prepolymerized catalyst having polymer in an amount from about 1 to about 1,000 g polymer per g of the catalyst (page 25, lines 17-24). The pre-polymerization treatment "allow to control the polymerization process in the gas phase without the drawbacks.... which are essentially due to the low heat transfer capability of the gas phase and to the formation of electrostatic charges, which determine the tendency of the catalyst and the polymer particles to adhere to the reactor walls" [***motivation***] (page 6, lines 7-13). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre-polymerized catalyst in the disclosure of Ala-Hulkku et al. to avoid fouling and thereby obtain the present invention.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.

LING-SUI CHOI
PRIMARY EXAMINER

January 15, 2007